

Appendix 8.2

Aerial Investigation Report



Springwell Solar Farm

Aerial Investigation Report

Springwell Energyfarm Ltd



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Non-technical summary

This report is an Aerial Investigation and Mapping report being completed prior to an Environmental Impact Assessment (EIA). This is in support of a development consent order (DCO) application for the construction of a 2,121-hectare solar farm. This report determines the location and quantity of below ground archaeological features existing as visible cropmarks or earthworks.

This report has identified six heritage assets, four of which are also recorded by the HER. The two newly identified heritage assets include a potential Bronze Age barrow and an undated square enclosure. It has been noted during this assessment that the extensive ploughing that has occurred within the PDA has limited the number of cropmarks and earthworks visible.

This report has provided an indication of the extent and complexity of the archaeological landscape within the PDA. These results will inform the interpretation of geophysical survey results and the layout of the proposed development.

1. Introduction

1.1. Planning Background

- 1.1.1. This report was commissioned by RSK on behalf of EDF Renewables and presents the results of an Aerial Investigation and Mapping report (AIM) being completed prior to an Environmental Impact Assessment (EIA). This is in support of a development consent order (DCO) application for the construction of a 2,121-hectare solar farm. The area spreads from south of the village of Metheringham, through the village of Scopwick towards the A15 road (see illus. 1).
- 1.1.2. This report will determine the location and quantity of below-ground archaeological features existing as visible cropmarks or as earthworks visible on LiDAR in order to aid the understanding of the potential for unknown heritage assets and the risks involved in the scheme encountering them. Once the AIM report has been completed the extent of potential impacts to the buried archaeological resource will be determined during the detailed assessment and evaluation programme.
- 1.1.3. This assessment has been undertaken in accordance with the guidelines set out in the Historic England guidance on *Aerial Investigation and Mapping*¹.

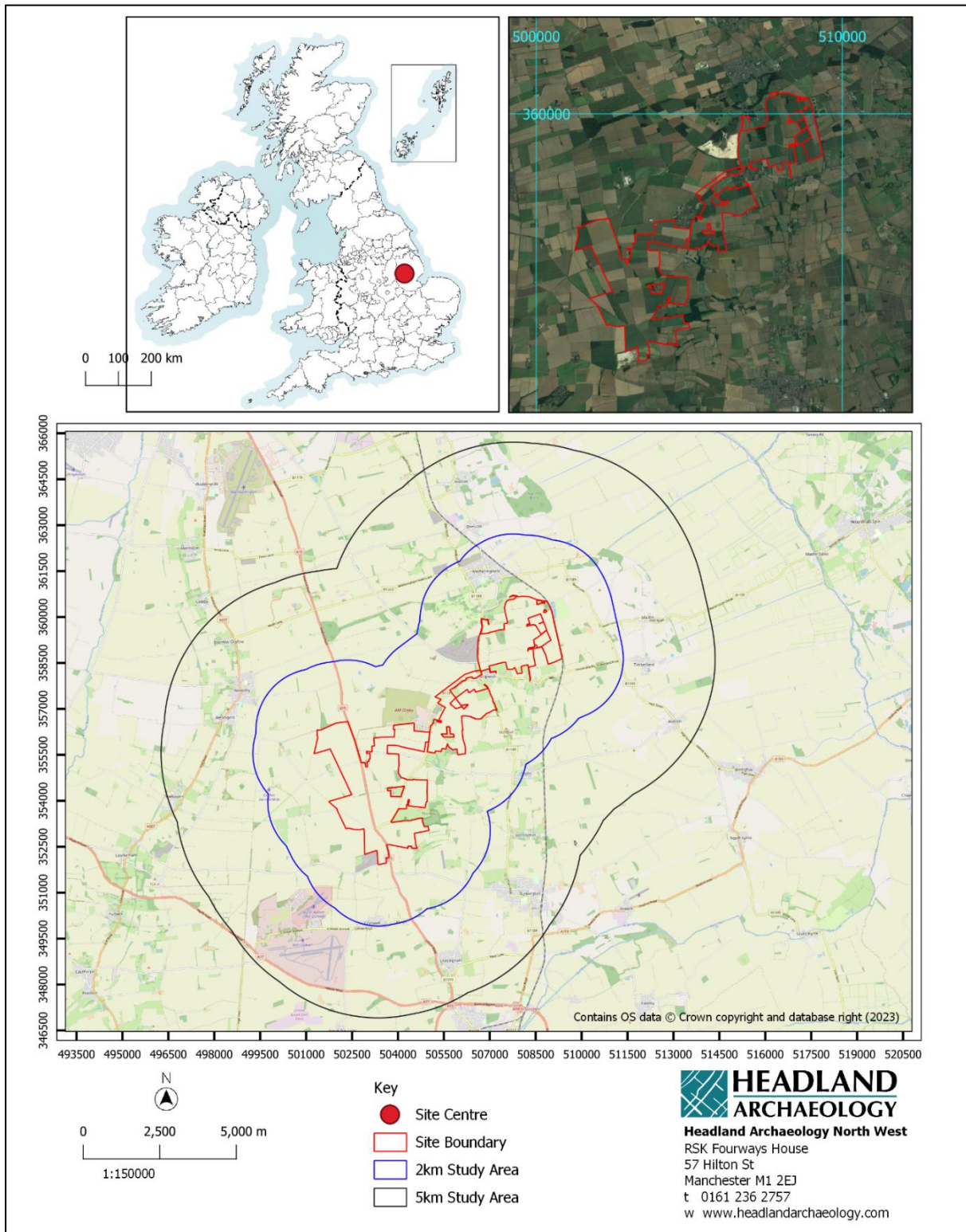
1.2. Site Description

- 1.2.1. The 2,121 ha PDA is located c.1 km to the south of the village of Metheringham in the north and runs south-west to the village of Scopwick and over the A15. In total the PDA measures c.10 km from its north-eastern tip at NGR TF 08641 60671 to the south-western end point at NGR TF 02905 52346. The PDA sits in Lincolnshire, 15 km south of Lincoln (NGR TF 05470 56654), post code LN4 3JE (Illus 1).
- 1.2.2. The PDA is divided into four areas, A1, A2, B and C, all of which are largely made up of agricultural fields. The area is generally flat with a slight incline to the south-west; Area A1 lies 48m above Ordnance datum (AOD), Area A2 lies 42m AOD, Area B lies 21m AOD and Area C lies 19m AOD.
- 1.2.3. Area A1 is bounded to the north, west and south by agricultural fields, to the east it is bounded by the A15 road. To the south-west of the site sits Brauncwell Quarry which is still active.
- 1.2.4. Area A2 is also bounded by agricultural fields to the east, south and north, the north is also bounded by RAF Digby. The west of Area A2 is bounded by the A15 road. Surrounded by Area A2 is the area of Slate House which is not included within the PDA.
- 1.2.5. Area B is bounded on all sides by agricultural fields but encircles the village of Scopwick in the north-western corner, it is to the south of the village of Ashby de la Launde, and to the west of RAF Digby. This area

¹ Historic England, 2019, Historic England Aerial Investigation & Mapping (formerly National Mapping Programme) Standards Technical Review, Research Report Series 46/2019.

also contains the farm of Rowston Top and a water treatment plant which are excluded from the PDA.

- 1.2.6. Area C is also bounded on all sides by agricultural fields but also by the villages of Blankney to the north and Scopwick and Kirkby Green to the south, as well as the Peterborough to Lincoln trainline to the east. There are numerous parts of this area which have been excluded, including woodland and Scopwick Low Field Farm.
- 1.2.7. There are a number of areas of woodland within the PDA along with numerous hedges and field boundaries. There is one watercourse that runs through the PDA in Area B to the water treatment plant. Scopwick Beck is the closest other watercourse that runs c.175m south of Area C.
- 1.2.8. At a wider topographic scale the proposed development site is located on flat ground that is largely of agricultural use with some small villages dotted across the landscape.



Illus 1. Site Location Plan

1.3. Geology and geomorphology

- 1.3.1. The underlying solid geology is recorded by BGS, there are 9 different bedrock geologies listed by BGS within the PDA, these are listed in Table 1 below.

Name of Formation	Description
Oxford Formation	Clay Mudstone. Sedimentary bedrock formed between 166.1 and 157.3 million years ago during the Jurassic period.
Kellaways Formation	Sandstone, siltstone and mudstone. Sedimentary bedrock formed between 166.1 and 163.5 million years ago during the Jurassic period.
Cornbrash Formation	Limestone. Sedimentary bedrock formed between 168.3 and 163.5 million years ago during the Jurassic period.
Blisworth Formation	Clay Mudstone. Sedimentary bedrock formed between 168.3 and 166.1 million years ago during the Jurassic period.
Blisworth Limestone Formation	Limestone. Sedimentary bedrock formed between 168.3 and 166.1 million years ago during the Jurassic period.
Rutland Formation	Argillaceous rocks with subordinate sandstone and limestone. Sedimentary bedrock formed between 170.3 and 166.1 million years ago during the Jurassic period.
Upper Lincolnshire Limestone Member	Limestone. Sedimentary bedrock formed between 170.3 and 168.3 million years ago during the Jurassic period.
Lower Lincolnshire Limestone Member	Limestone. Sedimentary bedrock formed between 170.3 and 168.3 million years ago during the Jurassic period.
Rutland Formation	Limestone. Sedimentary bedrock formed between 170.3 and 166.1 million years ago during the Jurassic period.

- 1.3.2. Superficial deposits are recorded in the south-western corner of the PDA. These are listed as Sleaford Sand and Gravel – sand and gravel and Head – clay, silt, sand and gravel. Both are sedimentary superficial deposit formed up to 2.588 million years ago during the Quaternary period.
- 1.3.3. There are 13 boreholes recorded by the BGS within or in close proximity to the PDA. 12 of these have publicly accessible records which show a stratigraphy of soil and gravel overlaying blue rock and limestone in places.

1.4. Professional standards and acknowledgements

- 1.4.1. Headland Archaeology (UK) is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA), an audited status which confirms that all work is carried out in accordance with the highest standards of the profession.
- 1.4.2. Headland Archaeology (UK), as part of the RSK Group, is recognised by the Institute of Historic Building Conservation (IHBC) under their ‘Historic Environment Service Provider Recognition’ scheme. This quality assurance standard acknowledges that RSK works to the conservation standards of the IHBC, the UK’s lead body for built and historic environment practitioners and specialists.

- 1.4.3. Headland Archaeology (UK) operates a quality management system to help ensure all projects are managed in a professional and transparent manner, which enables it to qualify for ISO 9001 (Quality Management), ISO 45001 (health and safety management) and ISO 14001 (environmental management).
- 1.4.4. Ordnance Survey data is produced under © Crown copyright and database rights Licence 100065113.
- 1.4.5. LiDAR data is reproduced © Environment Agency copyright and/or database rights 2023. All rights reserved.

2. Aims and Objectives

- 2.1.1. The aims of this aerial investigation report are to identify, map, record and interpret the form and extent of archaeological features visible as cropmarks, soil marks or earthworks in order to inform the assessment of the historic environment.
- 2.1.2. The objectives are therefore to:
- Collate all available written, graphic, photographic and electronic information relevant to this report;
 - Accurately rectify relevant aerial photographs and georeference them;
 - Transcribe archaeological features from georeferenced aerial sources and LiDAR;
 - Describe the nature and extent of visible archaeological features;

3. Methodology

3.1. Terminology – ‘Significance’ and ‘Importance’

- 3.1.1. Heritage assets are assessed in this report in terms of their significance and importance, following the requirement in NPPF paragraph 194 and HEAN12, and taking account of Historic England’s guidance in Managing Significance in Decision-Taking in the Historic Environment (GPA2²).
- 3.1.2. Impact assessment is concerned with effects on significance, the value or interest that applies to all heritage assets and relating to the ways in which the historic environment is valued both by specialists and the public.
- 3.1.3. The significance of a heritage asset will derive from factors including fabric, setting, rarity, completeness, historic and cultural associations, community, research and place-making potential. Significance is assessed in relation to the criteria in HEAN12³ (i.e. in archaeological, architectural, artistic, or historic terms), which are intended primarily to inform decisions regarding heritage designations, but may also be applied more generally in identifying the ‘special characteristics’ of a heritage asset, which contribute to its significance and should be protected, conserved and enhanced according to the NPPF.
- 3.1.4. This use of the word ‘significance’, referring to the range of values or interest attached to an asset, should not be confused with the unrelated usage in EIA where the ‘significance of an effect’ reflects the weight that should be attached to it in a planning decision.
- 3.1.5. Relative importance of each identified heritage asset potentially affected by the proposed development has been determined to provide a framework for comparison between different heritage assets and to inform subsequent stages of archaeological assessment and the development of any appropriate mitigation which may be required (See Table 2 below).
- 3.1.6. For further terminology and definitions, see Glossary at the end of the report.

3.2. Identification of heritage assets that may be affected

Data sources

- 3.2.1. The assessment has been based on a study of all readily available documentary sources. The following sources of information were referred to:
 - Designation data from the National Heritage List for England, downloaded from the Historic England website⁴ on 08.03.2023 and

² <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/>

³ <https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/>

⁴ <https://historicengland.org.uk/listing/the-list/data-downloads/>

descriptions of designated heritage assets viewed on the Historic England website;

- Historic England research records, viewed through the Heritage Gateway website⁵;
 - Aerial photographs in the Historic England Archive and other collections;
 - National Mapping Programme;
 - Archaeological records and aerial photographs held by Lincolnshire HER;
 - Historic maps and plans held in the Lincolnshire archive;
 - Environment Agency Lidar data⁶;
 - Geological data available online from the British Geological Survey⁷;
 - Relevant internet sources;
 - Readily available published sources and unpublished archaeological reports.
- 3.2.2. Any heritage assets newly identified as a result of this investigation are shown in Illus. 2 and are detailed in the gazetteer at the end of the report.
- 3.2.3. Heritage assets recorded by the HER and NHLE within the Proposed Development Area are shown and detailed in descriptions compiled within the Desk Based Assessment⁸.
- 3.2.4. Designated heritage assets are referenced in this report by National Heritage List for England list entry number. Non-designated assets are referenced by HER Preferred Reference or the National Record of the Historic Environment reference. Any newly discovered assets are assigned a number prefixed HA for Heritage Asset. A single asset number can refer to a group of related features, which may be recorded separately in the HER and other data sources.

Lidar

- 3.2.5. Light Detection and Ranging (LiDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. Up to 500,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated in which it is possible to identify shallow or otherwise imperceptible topographic features.
- 3.2.6. A Composite Digital Terrain Model (DTM) has been produced by removing objects from the Digital Surface Model (DSM) which is available at 1m resolution for the Site. Composite data breaks down by spatial resolution i.e. 2m, 1m, 50cm and 25cm and is made up from a

⁵ www.heritagegateway.org.uk

⁶ <https://environment.data.gov.uk/>

⁷ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

⁸ Headland Archaeology. 2023. Springwell Solar DCO, Archaeological Desk Based Assessment.

combination of the full EA dataset which has been merged and re-sampled to give the best possible coverage. This means that a 1m resolution tile may contain decimated 50cm data as well as native captured 1m data. It is not possible using only the composite to know which part of a given tile was surveyed at which resolution.

- 3.2.7. Analysis was undertaken by a professional archaeologist using QGIS imaging and geo-referencing/mapping software.

3.3. Limitations of baseline data

Data Sources

- 3.3.1. Information held by public data sources is generally considered to be reliable; however, the following general points are noted:
- HER records can be limited because opportunities for research, fieldwork and discovery depend on the situation of commercial development and occasional research projects, rather than the result of a more structured research framework. A lack of data within the HER records does not necessarily equal an absence of archaeology;
 - Where archaeological sites have been identified solely from aerial imagery without confirmation from archaeological excavation or supporting evidence in the form of find-spots for example, it is possible the interpretation may be revised in the light of further investigation.
 - The significance of sites can be difficult to identify from HER records, depending on the accuracy and reliability of the original source; and
 - There can often be a lack of dating evidence for archaeological sites.

3.4. Impact Assessment

Assessment of importance

- 3.4.1. The importance of a heritage asset is the overall value assigned to it reflecting its statutory designation or, in the case of non-designated assets, the professional judgement of the assessor (Table 2). Historic England guidance also refers to an asset's 'level of significance' (GPA2⁹, paragraph 10), which in this usage has the same meaning as importance.
- 3.4.2. Any feature which does not merit consideration in planning decisions due to its significance may be said to have negligible importance. It is the role of the professional judgements made by the assessor to identify any historic remains within the PDA that are considered to be of negligible importance, to justify no further works.

Importance of the asset	Criteria
Very High (International)	World Heritage Sites and other assets of equal international importance, that contribute to international research objectives

⁹ <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/>

High (National)	Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Battlefields, Grade I and II* Listed Buildings, and undesignated heritage assets of equivalent importance that contribute to national research objectives. Also Conservation Areas, Grade II Registered Parks and Gardens and Grade II Listed Buildings which have particular characteristics that merit a high level of importance.
Medium (National or Regional)	Conservation Areas, Grade II Registered Parks and Gardens, Grade II Listed Buildings except where their particular characteristics merit a higher level of importance, heritage assets on local lists and undesignated assets that contribute to Regional research objectives
Low (Local)	Locally listed heritage assets, except where their particular characteristics merit a higher level of importance, undesignated heritage assets of Local importance, including assets that may already be partially damaged
Negligible	Identified historic remains of no importance in planning considerations, or heritage assets and findspots that have already been removed or destroyed (i.e. 'site of')
Unknown / Uncertain	Heritage assets for which a level of importance cannot be defined on current information

3.4.3. The importance of heritage assets identified during this report is summarised within the survey results.

Potential for unknown heritage assets

3.4.4. Archaeological features are often impossible to identify through desk-based assessment. The likelihood that significant undiscovered heritage assets may be present within the Proposed Development Area is referred to as archaeological potential. The following factors are considered in assessing archaeological potential:

- The distribution and character of known archaeological remains in the vicinity, based principally on an appraisal of data in the Lincolnshire HER;
- The history of archaeological fieldwork and research in the surrounding area, which may give an indication of the reliability and completeness of existing records;
- Environmental factors such as geology, topography and soil quality, which would have influenced land-use in the past and can therefore be used to predict the distribution of archaeological remains;
- Land-use factors affecting the survival of archaeological remains, such as ploughing or quarrying; and
- Factors affecting the visibility of archaeological remains, which may relate to both environment and land-use, such as soils and geology (which may be more or less conducive to formation of cropmarks), arable cultivation (which has potential to show cropmarks and create surface artefact scatters), vegetation, which can conceal upstanding features, and superficial deposits such as peat and alluvium which can mask archaeological features.

4. Results

4.1. Archaeological Background

- 4.1.1. An archaeological desk based assessment (DBA) has been prepared separately to this report which fully details the archaeological and historical background of the site. This DBA has been used to summarise the salient elements of the archaeological background of the site.
- 4.1.2. There are 36 HER records of Prehistoric date within the site boundary, the majority of which are cropmarks recorded during the National Mapping Programme. There is little evidence for activity within the Red Line Boundary (RLB) and surrounding area before the late Neolithic, the majority of evidence dates to the Bronze Age. There are nine HER records of Bronze Age date within the site boundary, six of these are barrows, the remaining three are findspots including the location of a cremation.
- 4.1.3. Within the area surrounding the PDA there are considerable number of Bronze Age barrows also identified from aerial photography. It is clear that the PDA formed part of a Bronze Age funerary landscape and was most likely also subject to some level of occupation activity during this period. There are numerous HER records of generic Prehistoric date which form cropmarks of enclosures, settlements and agricultural features all recorded by the National Mapping Programme. It is probable that these recorded HER assets are of Bronze Age or later date as the datable evidence here shows the increase of activity during this period. There is evidence that this occupation and activity continued into the Iron Age with one HER asset recorded within the PDA (MLI81846), an area of enclosures and quarrying activity in the south of Area A1, and five further assets in the surrounding area.
- 4.1.4. The DBA concludes that there is low to negligible potential for previously unknown archaeological remains of early Prehistoric date within the PDA and that there is medium potential for previously unknown archaeological remains of Bronze Age to Iron Age date to survive here.
- 4.1.5. Activity within the PDA and surrounding area continued into the Roman period, centred around the two Roman roads that run north-south through the PDA (MLI60813; MLI86228). The area surrounding the PDA shows a wealthy rural Roman landscape with a number of villas recorded alongside Roman settlements that show evidence for agricultural processing. The desk based assessment concludes that there is medium to low potential for Roman remains to survive within the PDA.
- 4.1.6. There is limited archaeological evidence for early medieval activity within the PDA. A number of the surrounding settlements are recorded within the Domesday Book and likely originated in the early medieval period, but the only archaeological evidence of activity during this period are the Scheduled Medieval Villages of Brauncwell (NHLE1018397), which sits just within the southern area of the PDA, and Dunsby (NHLE1018395). While there is evidence for activity at these sites during the early medieval period, neither of them prospered until the 12th and 13th centuries. There

is considered to be low potential for previously unknown archaeological remains of early medieval date to survive within the PDA.

- 4.1.7. The evidence recorded by the HER and NHLE shows the medieval period as one of growth within the villages surrounding the PDA with sporadic agricultural activity surviving within the surrounding area. There are 11 heritage assets recorded by the HER within the PDA of medieval date, three are findspots and have been removed, six are records of cropmark evidence for agricultural activity including ridge and furrow, one is evidence of a medieval parish boundary, and one is part of the Ashby de la Launde settlement boundary. The distribution of this evidence suggests that the parts of the PDA closest to settlement activity were used for agriculture. The DBA concludes that there is low potential for previously unknown archaeological remains to survive within the PDA.
- 4.1.8. The desk based assessment concludes that the PDA and its surroundings were farmed intensively during the post-medieval period. This is most notably seen in this historic map regression which shows the PDA as a mixture of arable fields, pasture and meadow from the 19th century. There are 23 heritage assets recorded by the HER within the PDA of post-medieval date. These show that the PDA was used for extraction as well as agriculture during this period, there are 11 heritage assets relating to extraction recorded. The remaining heritage assets form farmhouses as well as assets relating to the manor at Brauncewell and the park at Blankney. It is assessed that there is medium to high potential for previously unknown archaeological remains of post-medieval date to survive within the PDA.
- 4.1.9. Evidence of the modern period is represented within the PDA as WWI and WWII remains, notably concentrated around the RAF Digby (MLI60621) area. Notably, in Area C there are two HER records relating to the Avro Lancaster Aircraft Crash Site (MLI125416) and Hawker Hurricane Aircraft Crash Site (MLI125417). There is considered to be medium potential for WWI and WWII remains to survive around the RAF Digby area, elsewhere there is considered to be low potential.

4.2. Disturbance

- 4.2.1. The PDA has been intensively ploughed since the post-medieval period which has caused extensive disturbance across the site. Many of the cropmarks identified as part of the National Mapping Programme are no longer visible on LiDAR or aerial photography, likely as a result of the use of the area for agriculture.

HA Identified Assets within Area A



Illus 2. HA Identified Assets within Area A

HA Identified Assets within Area C

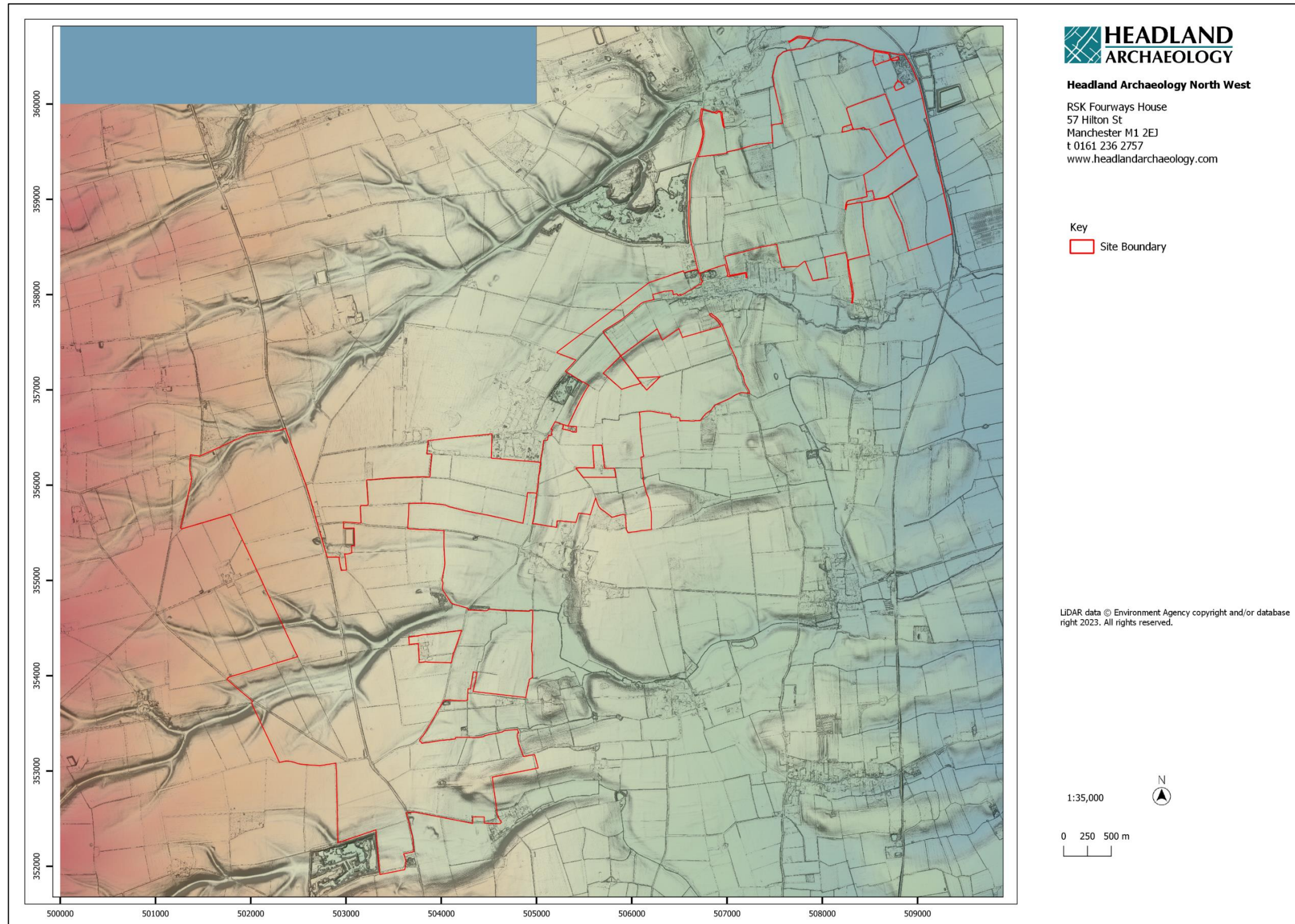


Illus 3. HA Identified Assets in Area C

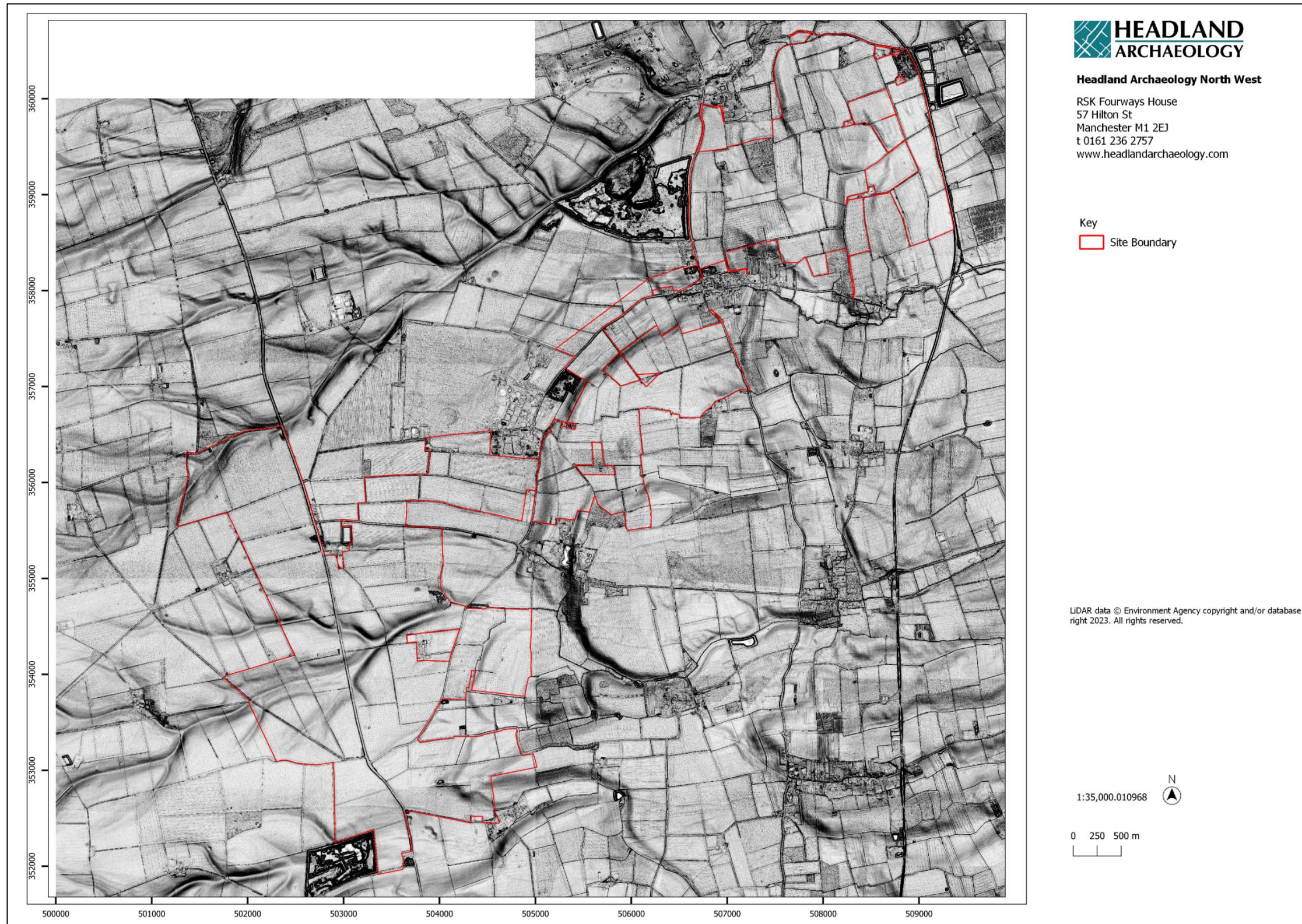
4.3. Survey Results

- 4.3.1. The extensive ploughing in the area has reduced the amount of heritage assets visible on LiDAR, modern satellite and historic aerial photography. Six heritage assets have been identified as part of this AIM report, four of which are also recorded by the HER but these digitisations do not accurately represent the shape and boundaries of these assets. Due to the limited number of heritage assets identified they will be addressed individually within this section. These heritage assets are shown in illustrations 2 and 3 above.
- 4.3.2. Alongside the six identified heritage assets the LiDAR analysis shows evidence across the area of the PDA of river channels that were once spread over this landscape. This can be seen in illustrations 4 to 6 below.

LiDAR Imagery



Illus 4. LiDAR Illustration with hillshade and slope rendering



Illus 5. LiDAR Illustration with Anisotropic Sky-View Factor rendering



Illus 6. LiDAR Illustration with Openness - Positive rendering

HA1 – Circular Features

- 4.3.3. This feature was identified initially from modern satellite imagery as a circular feature, c.24 m in diameter, as can be seen on illustration 7. The feature is also visible on historic aerial photography dating to 1976, as can be seen on illustration 8. However, the feature is not visible on LiDAR imagery.



Illus 7. Modern Satellite Photography showing HA1



Illus 8. Historic Aerial Photography (480) showing HA1 in the bottom left corner

- 4.3.4. It is thought that this feature is the cropmark of a barrow. Given the other evidence within the PDA and the surrounding area it is most likely that this cropmark represents a funerary barrow of Bronze Age date. As this feature is still visible on modern satellite imagery it is considered that there is medium potential for the feature to still survive below ground.
- 4.3.5. If remnants of this potential Bronze Age barrow do survive below ground, they would be of heritage significance due to their archaeological interest. Due to the commonality of such assets in this area and the likelihood of damage from ploughing this feature would be of low (local) importance.

HA2 – Enclosure

- 4.3.6. This feature has been identified from historic aerial photography and can be seen in illustration 9. This feature presents as a hexagonal enclosure as is the later version of HA4. The HER record MLI83188 sits within the same area as this feature but the polygon does not represent the actual shape presented within the historic aerial photography.



Illus 9. Historic Aerial Photograph (458) showing HA2 and HA3 in the top centre

- 4.3.7. The feature is recorded by the HER as Prehistoric in date. The wealth of evidence for Prehistoric cropmarks within the PDA and the surrounding area supports this date. As this feature is no longer visible on satellite or LiDAR imagery it is considered that there is medium potential for this feature to survive below ground.
- 4.3.8. If remnants of this enclosure do survive, they would be of heritage significance due to their archaeological interest. It is most likely that this feature would be of low (local) importance due to the nature of the asset and the probability that it has had some level of disturbance as a result of ploughing.

HA3 – Enclosure

- 4.3.9. This heritage asset has been identified from historic aerial photography and is an earlier version of the hexagonal enclosure recorded in HA2 and can be seen in illustration 9 above. As this feature is no longer visible on satellite or LiDAR imagery it is considered that there is medium potential for this feature to survive below ground.
- 4.3.10. If remnants of this enclosure do survive, they would be of heritage significance due to their archaeological interest. It is most likely that this feature would be of low (local) importance due to the nature of the asset

and the probability that it has had some level of disturbance as a result of ploughing.

HA4 – Mound Feature

4.3.11. This feature is visible as a small mound and has been digitised from the LiDAR imagery, as can be seen in illustrations 10 and 11. It is considered that this feature is most likely a barrow of Bronze Age date due to the other evidence within the PDA and surrounding area.



Illus 10. LiDAR across Area A rendered with hillshade and slope



Illus 11. Close up of HA4 rendered with hillshade and slope

- 4.3.12. It is unknown as to whether this feature is visible on site, but it is considered that there is low to medium potential that it still survives above ground, although its height may be limited. There is thought to be high potential that remnants of this asset survive below ground.
- 4.3.13. If these remains do survive, they would be of heritage significance due to their archaeological interest. It is considered that this feature would be of low (local) importance due to the commonality of similar features within the landscape.

HA5 – Square Enclosure

- 4.3.14. This feature presents as a square enclosure visible on aerial photography taken in 2011 (see illus. 12), however it is no longer visible on satellite imagery on LiDAR. This enclosure sits just south of another cropmark (HA6) which appears to be a boundary ditch. It is unknown whether the two are linked or to what period they may date. Both appear to be cut through by modern drainage features visible on illus 12.



Illus 12. Aerial Photograph (28158_006) showing HA5 and 6

- 4.3.15. As this feature is not visible on modern satellite imagery it is unlikely that any evidence exists above ground. However, there is considered to be medium potential that this feature survives below ground, although it may have been damaged as a result of ploughing and drainage.
- 4.3.16. If these remains do survive, they would be of heritage significance due to their archaeological interest and would be of low (local) importance).

HA6 – Boundary Ditch

- 4.3.17. This feature sits just north of HA5 and has been identified as a boundary ditch. It has been identified from aerial photography taken in 2011 (see illus. 12 above), however it is no longer visible on satellite imagery on LiDAR. It is possible that this heritage asset has already been recorded by the HER (MLI87449) as a potential undated cropmark boundary ditch. However, the digitisation within the HER does not accurately represent the shape or size of this feature so it has been replicated here.
- 4.3.18. As this feature is not visible on modern satellite imagery it is unlikely that any evidence exists above ground. However, there is considered to be medium potential that this feature survives below ground, although it may have been damaged as a result of ploughing.
- 4.3.19. If these remains do survive, they would be of heritage significance due to their archaeological interest and would be of low (local) importance).

5. Conclusions

- 5.1.1. The results of this aerial investigation and mapping report provides an accurate location for the known below-ground features visible as cropmarks and above-ground remains visible as earthworks.
- 5.1.2. This work allowed several sites already recorded by the HER to be accurately mapped for the first time allowing a better understanding of the landscape of the PDA. Two new features were recorded for the first time, an undated square enclosure in Area C and a potential Bronze Age barrow in Area A2. The undated square enclosure was identified as a cropmark from aerial photograph and the barrow as an earthwork during LiDAR analysis.
- 5.1.3. The extensive ploughing that has occurred within the PDA has limited the number of cropmarks and earthworks visible. There are a significant amount of assets that were identified by similar means used within this report as part of the NMP that are no longer visible. This is most likely a result of the agricultural activities within the PDA.
- 5.1.4. The results of this aerial investigation and mapping represent only a fraction of the archaeological features present. The absence of more cropmarks and earthworks across the area is not an indication of a lack of archaeological remains, but rather a result of the agricultural use of this area.
- 5.1.5. This report has provided an indication of the extent and complexity of the archaeological landscape within the PDA. The results will inform the interpretation of geophysical survey results and the layout of the proposed development. Together with the DBA and geophysical survey the results will also inform the scope of further investigation and mitigation proposals as necessary for the EIA.

6. Glossary

Definitions

Term	Definition
Curator	Archaeological advisor working to a statutory organisation controlling consents, such as the local planning authority, national heritage body or other government body.
Designated Heritage Asset	Assets registered on the National Heritage List for England. These may be protected by primary legislation (e.g. listed buildings, conservation areas, scheduled monuments) or have a non-statutory designation (e.g. World Heritage Sites, registered battlefields, registered parks and gardens, designated wrecks)
Heritage Asset NPPF (Annex 2)	<p>"A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest."</p> <p>Some heritage assets are designated as Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Registered Parks and Gardens, Registered Battlefields, or locally designated through policies in the Local Plan. Undesignated assets may be recorded in Historic Environment Records, while many other assets are currently unrecorded.</p> <p>Information contained in HERs and SMRs is not definitive, since they may include features which, for instance, have been entirely removed, or are of uncertain location, dubious identification, or negligible importance. The identification of undesignated heritage assets is therefore to some extent a matter of professional judgement.</p> <p>Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; and assets may overlap or be nested within one another.</p>
Listed Building	A building or structure which is considered to be of 'special architectural or historic interest'
Non-Designated Heritage Asset	Assets identified by the local planning authority or national registers for the historic environment which have no formal designation but are considered to have a degree of significance meriting consideration in planning decisions. These can include locally listed buildings, information on sites held by the relevant Historic Environment Record and National Record of the Historic Environment
Archaeological Site (also 'Monuments')	Heritage assets which may consist of surface and/or sub-surface remains, features, deposits and/or material relating to past human activity with a degree of significance meriting consideration in planning decisions.
Significance: NPPF	"the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting"
Significance: GAPN 2	"The significance of a heritage asset is the sum of its archaeological, architectural, historic, and artistic interest. A variety of terms are used in designation criteria (for example, outstanding universal value for World Heritage Sites, national importance for scheduled monuments and special

	interest for listed buildings and conservation areas), but all of these refer to a heritage asset's significance."
Significance: NPPF (PPG para 6) and Historic England guidance Statement of Heritage Significance: Analysing Significance in Heritage Assets (2019, HEAN 12)	<p>Cultural values in the historic environment that people want to enjoy and sustain for the benefit of present and future generations.</p> <p>Archaeological - There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point;</p> <p>Architectural - These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types;</p> <p>Artistic - Artistic interest is an interest in other human creative skills, like sculpture;</p> <p>Historic - An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.</p>
Setting: NPPF	"The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate the significance or may be neutral" (an extended consideration of Setting is contained in GAPN 3)

Terms

Term	Definition
Artefact	An item of archaeological interest
Baseline	'Baseline conditions' are the environmental conditions in existence just before the occurrence of an impact – i.e. they are the conditions that would be affected.
Bronze Age	The period of human activity between 2,500 BCE and 700 BCE
Construction Environmental Management Plan (CEMP)	A plan prepared by a contractor before the start of construction work, detailing 'environmental aspects' that may be affected by the construction work and management methods to prevent any such effects. The CEMP would include methods and site management practices to be applied to prevent generation of nuisance dust, accidental pollution events and a range of other potential sources of accidental damage to the environment, and response and reporting procedures to minimise the damage in the event of a pollution incident.
Construction activity	Vegetation removal, topsoil stripping, temporary storage of materials, ground excavation and remodelling, bare earth, movement of construction vehicles and tall features such as cranes and other construction plant.
Desk study	A collation and review of relevant existing information available from published, archival or online sources, including for instance geological and hydrogeological mapping, historical maps, environmental records etc.,

	allowing an assessment of risks to the human and environmental receptors to be undertaken.
Earthworks	The moving of soil or rock to reconfigure the topography of a site.
Enclosure	A single or collection of boundaries surrounding a parcel of land. e.g.: hedgerows, walls, ditches, earth banks, fences etc.
Environmental Impact Assessment (EIA)	An assessment of certain types of major project of the significant effects that the project could have on the environment. The applicant is required to carry out the assessment by law, in this case under the Infrastructure Planning (Environmental Impact Assessment) Regulations, 2017.
Environmental Statement (ES)	The report on the results of the EIA.
Fieldwalking survey	Method of systematic non-intrusive survey involving walking across a plough field along transects to collect archaeological artefacts.
Geology	Geology is the study of solid earth, the material of which it is composed (principally rocks) and the processes by which they evolve.
Geophysical survey	Method of non-intrusive investigation involving the use of magnetometers to identify fluctuations in the earth's magnetic field which might indicate the presence of archaeological remains. Buried remains and metals are best identified through this method of survey.
Heritage asset	An item of heritage interest, for example an historic building or an archaeological find.
Historic Environment Records (HER)	A database maintained by individual counties or local authorities, containing records of archaeological sites, historic buildings and other aspects.
Historic landscape character types (HLCT)	Historic landscape character types are distinctive and repeated combinations of components defining generic historic landscapes such as 'ancient woodland' or 'parliamentary enclosure'. The types used in this study were defined based on evidence from historic maps and other sources.
Inclosure	A process of consolidating and adding fixed boundaries to agricultural fields by act of parliament, local government or, in some cases, by formal civil contract. The spelling of "inclosure" changed by time and location and thus, acts of "Inclosure" or "Enclosure" are interchangeable in the historical record. In this report, Inclosure is used for consistency.
Iron Age	The period of human activity between 700 BCE and 43 CE
Made Ground	Ground created by infilling an area with material taken from elsewhere; typically, reworked soils, rubble, gravel, sand or former waste material e.g. ash.
Medieval	The period of human activity between 1066 CE and 1550 CE
Mesolithic	Middle Stone Age. The period of human activity between 10,000 BCE and 4,500 BCE.
Metal detector survey	Method of intrusive investigation involving the use of metal detectors to locate buried metal objects.
Mitigation	Measures which have the purpose of avoiding, reducing or compensating for adverse environmental impacts. It may also include measures to create environmental benefits.
Modern	The period of human activity from 1900 to the present day

National Mapping Programme (NMP)	A project funded by Historic England and local councils involving assessment and interpretation of aerial photographs and other remote sensing data, such as LiDAR.
Neolithic	New Stone Age. The period of human activity between 4,500 BCE and 2,500 BCE
Ordnance Datum	The standard measure of sea level in the UK, from which all heights are measured for mapping purposes.
Palaeolithic	Old Stone Age. The period of human and pre-human activity before around 10,000 BCE
Photomontage	A photorealistic image of the scheme, based on a 3D computer model of the scheme, overlaid onto a base photograph to visually represent the scheme. Features that would be removed as part of the scheme are removed from the base photograph.
Post-medieval	The period of human activity between 1550 CE and 1900 CE
Prehistoric	The period before the year 43 CE
Receptor	The existing environmental feature that would be affected by an impact – for instance a specific archaeological site
Requirement	A requirement listed as a condition of planning permission
Roman	The period of human activity between 43 CE and 410 CE
Saxon	The period of human activity between 410 CE and 1066 CE
Statutory Consultation	Community and stakeholder consultation carried out in line with the statutory requirements set out in s42, s47 and s48 of the Planning Act 2008
Statutory consultees	Organisations that the Client is required to consult under s42 of the Planning Act 2008. Statutory consultees are listed in Schedule 1 of the APFP 2009
Zone of Theoretical Influence (ZVI)	The zone from which the scheme could theoretically impart an impact based partly on visibility and professional judgement
Zone of Theoretical Visibility (ZTV)	The zone from which the scheme is theoretically visible over ‘bare earth’

Abbreviations and Acronyms

AOD	Above Ordnance Datum (above sea-level)
AP	Aerial Photograph
ASA	Archaeologically Sensitive Area
BCE	Before Common Era
BGS	British Geological Survey
BH	Borehole
C	Century
c.	Circa
CA	Conservation Area
CBM	Ceramic building material

CE	Common Era
CEMP	Construction Environment Management Plan
ClfA	Chartered Institute for Archaeologists
DBA	Desk-based Assessment
DCO	Development Consent Order
DCLG	Department for Communities and Local Government
DMV/SMV	Deserted/Shrunken Medieval Village
EMS	Environmental Management System certified to ISO 14001: 2004
ES	Environmental Statement
Eval.	Evaluation Trial Trenching
Geophys.	Geophysical Survey
HA	Headland Archaeology
HE	Historic England
HER	Historic Environment Record
HLC	Historic Landscape Character(isation)
HSE	Health and Safety Executive
LB	Listed Building
LPA	Local Planning Authority
LiDAR	Light Detection and Ranging
MLWS	Mean low water springs
NGR	National Grid Reference
NHLE	National Heritage List for England
NRHE	National Record of the Historic Environment
OS	Ordnance Survey
R&F	Ridge and Furrow (earthwork cultivation)
RO	Registered Organisation (with ClfA)
RPG	Registered Park & Garden
SM	Scheduled Monument
SMP	Soil Management Plan
SMS	'Strip, Map and Sample'
WB	Watching Brief
WSI	Written Scheme of Investigation (project design or method statement)
ZTV	Zone of Theoretical Visibility

7. References

Bibliographic references

Historic England, 2019, *Historic England Aerial Investigation & Mapping (formerly National Mapping Programme) Standards Technical Review, Research Report Series*. 46/2019.

Headland Archaeology. 2023. *Springwell Solar DCO, Archaeological Desk Based Assessment*. EDF Ltd.

Essex County Council. 2020. *Longfield Solar Scheme, near Terling: Aerial Investigation and Mapping Report*. AECOM.

Aerial Photographs

Headland ID	Library Reference	Sortie	Date	Frame Numbers
458	9933	OS/76137	05 JUL 1976	164
460	9933	OS/76137	05 JUL 1976	167
467	9933	OS/76137	05 JUL 1976	226
480	9933	OS/76137	05 JUL 1976	260
485	21271	MAL/61478	30 JUN 1961	91833
486	21271	MAL/61478	30 JUN 1961	91835
493	597	RAF/CPE/UK/2009	16 APR 1947	1454
494	597	RAF/CPE/UK/2009	16 APR 1947	2453
504	597	RAF/CPE/UK/2009	16 APR 1947	4453
523	TF 0453 / 1	NMR 3118	24 JUL 1986	328-329
579/580	TF 0860 / 1	JAP 19434	15 JUL 1998	K122
581/582	TF 0858 / 8	JAP 19442	05 JUL 1995	H154

Appendix 1: Heritage assets discussed in this assessment

HA Asset Ref	HER Number	Name	Description	Easting	Northing	Importance
HA1	MLI87443	Circular Feature	Identified off APs 0467 and 0480. It is thought that this is most likely a barrow of Bronze Age date.	508306	358563	Low
HA2	MLI83188	Enclosure	Identified off APs 0458 and 0523. This feature is hexagonal in shape and is recorded by the HER as a possible Prehistoric enclosure.	504597	353212	Low
HA3	MLI83188	Enclosure	Identified off APs 0458 and 0523. This feature is thought to be an earlier version of HA3.	504597	353212	Low
HA4		Small Mound	Identified off LIDAR this feature presents as a small mound and it potentially a barrow of Bronze Age date.	503791	354862	Low
HA5		Square Enclosure	Identified off AP 28158_006 and presents as a square enclosure.	508435	359341	Low
HA6	MLI87449	Boundary Ditch	Identified off AP 28158_006 and is a boundary ditch recorded by the HER as undated.	508410	359374	Low



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